



Design specifications for detectable (truncated) warnings

The detectable warning is defined as "a standardized surface feature built in or applied to the walking surface or other elements to warn visually impaired people of hazards on a circulation path". All detectable warnings shall be in compliance with the Americans with Disabilities Act of 1990 Accessibility Guidelines (AGMG) as detailed in 28 CFR Part 35. Detectable warnings shall consist of raised truncated domes with as:

- Bottom diameter of 23 mm (0.9 in)
- Top diameter of 10 mm (0.4 in)
- Height of 5 mm (0.2 in)
- Center-to-center spacing of 68 mm (2.35 in)
- The color of the detectable warning should contrast visually with adjoining surfaces either light on dark or dark on light. The material used to provide contrast should contrast by at least 70 percent.

Detectable warnings shall be laid out on a triangular grid or a square grid (parallel alignment). When installed on curb ramps, only the lower 68 mm (2.35 in) of the entire curb ramp width shall be covered (excluding the flared top) rather than the entire length of the ramp to maximize the detectability and to minimize the negative impact on people who rely on wheeled devices for mobility. The detectable warnings shall be installed such that the edge nearest the curb line is 152 mm to 200 mm (6 in to 8 in) behind the curb line.

- GENERAL NOTES
1. THE EXPANSION JOINT IS TO BE REPLACED WHERE THE NEW RAMP OR SIDEWALK JOINS EXISTING PAVEMENT STRUCTURE.
 2. EXPANSION JOINT MATERIAL TO BE IN ACCORDANCE WITH ARTICLE 832.01 AND 832.02 OF ALABAMA DEPARTMENT OF TRANSPORTATION SPECIFICATIONS.
 3. THE SUBGRADE SHALL BE FREE OF ALL ROOTS AND OTHER UNDESIRABLE MATERIALS WITH THE ROOTS CUT BACK ONE (1) FOOT FROM FACE OF SIDEWALK.
 4. RAMPS SHALL HAVE A NON-SKID SURFACE APPLIED BY BRUSHING TRANSVERSELY OR GROOVING.
 5. SIDEWALK TO BE 4 INCHES THICK
 6. RAMPS SHALL HAVE A NON-SKID SURFACE APPLIED BY BRUSHING TRANSVERSELY OR GROOVING.
 7. TRUNCATED DOMES MEETING THE SIZE AND SPACING SHOWN SHALL BE CONSTRUCTED 2" WIDE FOR THE LENGTH OF THE RAMP.
 8. WHERE SIDEWALKS ARE REQUIRED THIS PLAN SHALL BE USED AT PEDESTRIAN CROSSWALKS FOR SAFE AND CONVENIENT MOVEMENT OF THE HANDICAPPED AND PERSONS USING WHEEL CHAIRS.
 9. INSTALL DETECTABLE WARNINGS (TRUNCATED DOMES) FOR A DISTANCE OF 24" FROM THE BACK OF THE CURB FOR THE ENTIRE WIDTH OF THE RAMP OPENING SHOWN.
 10. PAVERS SHALL MEET ASTM C 902 CLASS SX, TYPE I, OR C 936, OR C 1272 TYPE R.
 11. PAVERS WILL BE LAID ON TOP OF A 4" CONCRETE BASE. SETTING BED AND JOINTS TO BE MORTARED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS OR WITH A MAXIMUM 1/2" THICK BED OF LATEX MODIFIED CEMENT MORTAR JOINTS TO A WIDTH OF 3/8". PAVERS SHALL NOT BE DIRECTLY TOUCHING EACH OTHER UNLESS THEY HAVE SPACING BARS.
 12. MORTARED JOINTS ARE TO BE FLUSH WITH THE TOP SURFACE AND STRUCK SO AS TO GIVE A SMOOTH SURFACE. PAVERS SHALL BE LAID SUCH THAT JOINTS ARE LEVEL WITH ADJOINING JOINTS SO AS TO PROVIDE A SMOOTH TRANSITION FROM BRICK TO BRICK AND BRICK TO CONCRETE SURFACE.
 13. THE SURFACE OF ANY TWO ADJACENT UNITS SHOULD NOT DIFFER BY MORE THAN 1/32". JOINTS SHALL BE PLACED IN A HERRINGBONE PATTERN WHERE POSSIBLE. THE PATTERN OF THE JOINTS IS TO BE MAINTAINED PER ADA REQUIREMENTS. FACE OF ALL BRICK SHALL BE CLEAN, FLAT AND PROTECTED SO AS TO AVOID CHIPPING DURING CONSTRUCTION.
 14. EXPANSION JOINTS SHALL BE PROVIDED IN THE CURB RAMP AS EXTENSIONS OF WALK JOINTS FOR A NEW CONCRETE WALK. 1/2" EXPANSION JOINT FILLER SHALL BE PROVIDED AROUND THE EDGE OF RAMPS BUILT IN EXISTING CONCRETE WALKS. LINES SHOWN ON THIS DRAWING INDICATE THE RAMP EDGE AND SLOPE CHANGES AND ARE NOT NECESSARILY JOINT LINES.

CITY OF HUNTSVILLE	
HANDICAP RAMP SPECS & GENERAL NOTES	
ENGINEER OF PUBLIC WORKS CITY OF HUNTSVILLE, ALABAMA	



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**U.S. Department of Transportation
Federal Highway Administration**

Memorandum

Subject: INFORMATION: ADAAG Detectable Warnings
(Truncated Domes)**Date:** May 6, 2002**From:** (Original signed by)
Dwight A. Horne
Director, Office of Program Administration**In reply, refer to:** HIPA-20**To:** Resource Center Managers
Division Administrators
Federal Lands Highway Division Engineers

Recently a number of questions have been raised by people from various agencies concerning the use of detectable warnings, specifically truncated domes, when constructing or altering curb ramps. Truncated domes are the standard design requirement for detectable warnings for determining the boundary between the sidewalk and street by people with visual disabilities.

The Department of Justice (DOJ) is the lead agency that oversees the Americans with Disabilities Act (ADA)(1990). The U.S. Access Board develops the minimum design standards for complying with the ADA. The Department of Transportation is a designated agency responsible for enforcing the standards and implementing regulations of the ADA's Title II (State and Local Government Services). The Federal Highway Administration (FHWA) is the enforcement authority for overseeing pedestrian discrimination issues under the Title II implementing regulations.

Detectable warnings were required in 1991 by the Americans with Disabilities Act Accessible Guideline (ADAAG) (regulatory standards) for hazardous vehicular ways, transit platform edges, and curb ramps. A suspension was placed on requiring detectable warnings at curb ramps and hazardous vehicular ways, but not for transit platform edges. The reason for the suspension was to conduct research on the performance of their detectability. The DOJ continued the suspension through July 26, 2001, which allowed 10 years for conducting research. The research determined that other designs used in place of truncated domes such as grooves, striations, and exposed aggregate, were not detectable in the sidewalk and roadway environment because of the similarities to other surface textures and defects. Truncated domes have a unique design that can be detected underfoot and with a cane, and other surfaces are not considered ADA equivalent and therefore do not comply with the ADA requirements.

The DOJ had the option of allowing the suspension to expire on July 26, 2001 or publish a Federal Register Notice to continue the suspension. They decided to let the suspension expire. Consequently, since July 26, 2001 detectable warnings are again required. FHWA is obligated to enforce the requirements, and State and local governments are required to apply the minimum design standards when constructing and altering pedestrian facilities, though we encourage higher than minimum standards where possible.

The original ADA design standard for truncated domes is found in ADAAG (4.29.2). After the research was conducted, a new design recommendation was made for the dimension and placement of the domes on curb ramps. Both FHWA and the U.S. Access Board are encouraging the use of the new design over the original. Information on the recommended design and other useful information are included in the attachment.

Attachment

Information on Detectable Warnings (truncated domes)

Detectable warnings are an Americans with Disabilities Act (ADA) requirement in the current Americans with Disabilities Act Accessibility Guidelines (ADAAG) for the use of detecting the boundary between the sidewalk and the street. The original requirement in ADAAG was suspended for a time to conduct further research. Research was conducted, and the suspension of the requirement was lifted on July 26, 2001, and are now required when constructing and altering curb ramps. Truncated domes are the only detectable warnings allowed by ADAAG. Grooves, exposed aggregate, and other designs intended for use as detectable warning are too similar to pavement textures, cracks and joints and are not considered equivalent facilitation. Truncated domes are a unique design and have proven to be the most detectable surface.

Where to find information on detectable warnings:

Where to find the regulation on the suspension and requirement:

The US Department of Justice website, www.usdoj.gov/crt/ada/detwarn.htm, or visit the US Access Board's website, www.access-board.gov, click on "publications," go to "facilities," go to "Detectable Warnings: Final Rule"

Where to find the design and application requirement in ADAAG:

Visit the US Access Board's website, www.access-board.gov, click on "publications," go to "facilities," go to "ADA Accessibility Guidelines (ADAAG)" -the provision is in 4.7.7 under Curb Ramps

Where to find technical information and a list of manufactures:

Visit the US Access Board's website, www.access-board.gov, click on "publications," go to "Public Rights-of-Way," go to *Detectable Warnings: Synthesis of US and International Practice*

Where to find the recommended design for curb ramps:

Visit the US Access Board's website, www.access-board.gov, click on "publications," go to "Public Rights-of-Way," go to *Building A True Community: Accessible Public Rights-of-Ways*, sections X02.5.6.2 through X02.5.7.3. After a number of years of research there is a new recommended design for detectable warning/truncated dome. Both the US Access Board and FHWA recommend the new design pattern and application over the original ADAAG design. FHWA's *Designing Sidewalks and Trails for Access, Part II, Best Practices Design Guide* has comparable information to the Building A True Community report. At the time the FHWA Designing Sidewalks and Trails for Access, went to print, the suspension had not been lifted, so the text in Chapter 6 does not mention that detectable warnings are required.

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To provide Feedback, Suggestions or Comments for this page contact John C. Fegan at john.fegan@fhwa.dot.gov.



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